

REMARKS

Claims 1-26 and 30-40 are pending.

Allowable Subject Matter

The indication that claims 38-40 constitute allowable subject matter is noted with appreciation.

Prior Art Rejections

The prior art rejections are addressed below in the order raised in the Action. Rather than reiterating the arguments made in previous Replies, focus is placed below on advancing the arguments further, in response to the observations made in the latest Action.

Combination of Gumley (Gumley '119) and Rapp

Claims 1, 2, 5-10, 15-17, 20, and 30-32 stand rejected under 35 USC 103(a) as obvious over Gumley, U.S. Patent No. 6,320,119 ("Gumley"), in view of Rapp, U.S. Patent No. 6,649,825 ("Rapp").

With regard to the observations made in paragraph 46 of the Action, many of the points regarding Rapp are well taken. Applicants agree that Rapp discloses a lightning rod that is capable of accepting several types of tips, as parts of different end caps. Applicants also agree that the several different types of tips disclosed in Rapp are likely to have some difference in electrical characteristics. Of course Rapp's end caps are disclosed for use in the context of Rapp's simple single-rod device, without any structure than the tip used for attracting lightning strikes. Applicants also agree that Gumley discloses in its background section various shapes of tips, again in the context of simple single-rod devices.

One point of disagreement is whether Gumley's device shown in Fig. 2 has sharp

points that provide a hazard. The "sharp points" at the top of the central rod and the curved conductive surface are cited as being potentially hazardous. These features are not hazardous. The conical top 34 of Gumley's central rod 21 does have a relatively sharp lip 35 around its circumference. However, the rod lip 35 is not pointed upward, but radially outward, making it much less of a hazard than an upward-directed sharp point. Moreover, the rod lip 35 is recessed relative to the blunt tip 38 of Gumley's non-conducting ring 36. This is shown in Figs. 2 and 3 of Gumley, and is described at col. 6, lines 54-63 of Gumley: "The very tip of the ring indicated at 38 is positioned just proud of the shortest spark track between the top of the central conductor and the ring 28. The tip of the annular non-conducting ring will project preferably from about 1 millimeters [sic] to about 2 millimeters above the shortest line of the spark or arc so that the spark must literally jump over the ring tip 38 as indicated at 39 and enter a stronger electric field." Anyone encountering both Gumley and Rapp would certainly find Gumley's recessed lip 35 to be safe, especially in view of Rapp's teaching of making its sharp pointed tip 15 safe by placing the tip 15 in a concave element, lower than a surrounding impact surface, Rapp, col. 6, lines 27-31; Fig. 5.

Gumley's ring 28 has an undercut inner edge 29, which Gumley describes as "forming a relatively sharp edge 30 at the top," col. 6, lines 43-46. But like central rod lip 35 discussed above, the ring edge 30 is not pointed upward. Rather the edge 30 is pointed radially inward. Also like the central rod lip 35, the ring edge 30 is recessed, located close to and below the blunt ring tip 38.

Further, Rapp teaches nothing that would have the slightest effect on any hazard that might be created by an edge of Gumley's curved surface 24. Replacing Gumley's central rod top 34 at the same location with any of Rapp's tips would do nothing to improve the safety of the edge 30 of Gumley's ring 28.

Even accepting for the sake of argument that the motivation for the proposed combination need not be the same as that of the applicants, neither the references nor

the art in general teach or suggest modifying Gumley's device with Rapp's replaceable tips in the interest of making Gumley's device safer. To begin with, as discussed at length in the last few paragraphs, Gumley's device does not have the safety issue that the proposed combination is supposed to remedy. Since there is no hazard to remedy, there is no reason to even consider substituting Rapp's tips for Gumley's central rod top in the interest of safety.

Moreover, there is no motivation for substituting Rapp's tips for Gumley's rod top because many of Rapp's tips present more of a threat to safety than Gumley's rounded, recessed rod top. Although the undersigned is not in the habit of falling face-first onto lightning protection devices, if he had to do so he would prefer doing so onto Gumley's Fig. 2 device, with its rounded shape, rather than the tips shown in Figs. 4, 5, and 11 of Rapp, with their sharp points. While one might accept the proposed combination if it actually made Gumley's device less hazardous, such a motivation cannot be maintained when the effect would be to make Gumley's device, if anything, *more hazardous*.

In view of the above, and the arguments made in the previous Reply, claims 1, 2, 5-10, 15-17, and 20 are patentable over Gumley and Rapp.

The arguments against the proposed combination of Gumley and Rapp with equal force (and probably with greater force) regarding claim 30. Claim 30 affirmatively recites controlling electrical field characteristics and controlling the width of a spark gap by selecting a tip for coupling to a tip mount of the central rod. Neither reference teaches or suggests controlling spark width gap by selecting from among tips with different diameters. There appears to be no basis for the long leap of not only using Rapp's different tips, but assuming that the different tips would have different diameters. The motivation for the proposed combination has nothing to do with using Gumley to modify Rapp's tips to have different diameters. For the reasons offered in this Reply and the last Reply, claims 30-32 are patentable over Gumley and Rapp.

Combination of Gumley, Rapp, and Goldman

Claims 11-14, 22-26, and 33-36 stand rejected under 35 USC 103(a) over Gumley in view of Rapp, further in view of Goldman et al., U.S. Patent No. 4,652,694 ("Goldman").

Goldman discloses a corona discharge lightning rod 1 that includes a voltage generator 12 that is connected to a conductive tip 11 via a conductor 13 and a resistor 16. The voltage generator 12 provides a voltage to the tip 11 that produces a corona effect around the chip, which provides a circuit path to ground via impedance of the ambient atmosphere. Col. 6, lines 4-11. The Goldman device also includes a discharger 15 which is described as being "equivalent to a capacitance connected in parallel with a series connection comprising a variable resistance and an inductance" that "comes into operation only during a lightning strike." This is in contrast with "the remainder of the circuit," which "operates prior to a lightning strike so as to encourage the lightning to make use of the lightning rod." Col. 6, lines 16-25. Goldman's discharger 15 is shown in Fig. 8 as an air gap, as is the discharger means 2 shown in Fig. 6 of Goldman (which appears to be the same part of Goldman's device). The discharger means 2 is described by Goldman as constituting "two metal parts separated by an air gap," or alternatively "dynamic means operating like a controlled switch." Col. 5, lines 9-15. Goldman does not have any sort of conductive shell around its rod or tip, and does not disclose a variable impedance unit between a rod and a shell around a rod.

Goldman does not provide the missing motivation for combining Gumley and Rapp, that is discussed above with regard to claim 1. For this reason claims 11-14 and 33-36 are patentable over Gumley, Rapp, and Goldman.

In addition, Goldman does not teach or suggest a variable impedance unit. Goldman does not teach any particular structure for the discharger 15. The discharger 15 shown in the circuit diagram of Fig. 7 appears to be nothing more than a

representation of a spark gap. Goldman does not say that the discharger 15 has a capacitor, an inductor, a resistor, or any other particular structure. Rather Goldman states that the discharger is *equivalent* to various electrical components. A spark gap, which is all that Goldman discloses with regard to the structure of the discharger 15, is not a variable impedance unit.

Further, it would have not been obvious to have made the proposed modification, placing components of Goldman's discharge unit 15 between Gumley's central conductive rod 21 and curved conductive surface 24. Goldman's device needs the discharger 15 because in normal operation its tip 11 is electrically isolated from ground. Abstract. All of Gumley's central rod 21 is electrically connected to ground at all times. Gumley also already has an impedance/resistance unit 42 between the curved electrical surface 24 and the grounded central rod 21. While Goldman's discharger 15 is used only to discharge voltage from a lightning strike, col. 6, lines 18-25, Gumley's impedance/resistance unit 42 is used in controlling triggering of Gumley's device, col. 6, line 64 – col. 7, line 5. Goldman's device, which has no outer shell, is a completely different type of device from both Gumley's device and the claimed device, and its use of an air gap discharger 15 does not teach or suggest anything about electrical connection between a conductive shell and a central rod. Goldman certainly does not teach or suggest modifying Gumley's device for the stated reason, "to protect against lightning strikes by causing the lightning strike current to be discharged through the discharger and to ground."

Thus for multiple reasons claims 11-14, 22-26, and 33-36 are patentable over Gumley, Rapp, and Goldman.

Other Combinations of Involving Gumley and Rapp

Claims 3 and 4 stand rejected under 35 USC 103(a) as obvious over Gumley in view of Rapp, further in view of Gumley, U.S. Patent No. 4,760,213. Claims 18 and 19

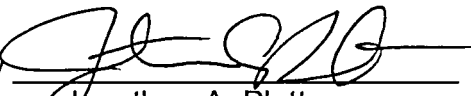
stand rejected under 35 USC 103(a) as obvious over Gumley in view of Rapp, further in view of Gumley, WO 94/17578. Claim 21 stands rejected under 35 USC 103(a) over Gumley in view of Rapp, further in view of Mansfield et al., U.S. Patent No. 5,652,690. The tertiary references cited in these combinations do not make up for the lack of motivation to combine Gumley and Rapp, as discussed above.

Conclusion

For at least the foregoing reasons, withdrawal of the rejections of the claims is respectfully requested, in which event this application would be in condition for allowance. Should the Examiner believe that a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

No fee is believed due with the filing of this paper. In the event any fees are due in connection with the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account No. 18-0988 (Charge No. ERICP0343US).

Respectfully submitted,
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